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Indian Standard

TYRE YARNS, CORDS AND TYRE CORD WARPSHEETS MADE FROM MAN-MADE FIBRES — METHODS OF TEST

PART 4 DIP PICK-UP

(First Revision)

भारतीय मानक

कृत्रिम रेशों से निर्मित टायर सूत, डोरी और टायर डोरी ताना-चद्दरों की परीक्षण पद्धतियाँ

भाग 4 डिप पिक-अप

(पहला पुनरीक्षण)

UDC 677·072·6 : 629·11·012·553·1 : 677·016 : 677·026·223·25

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

January 1990 **Price Group 2**

Physical Methods of Test Sectional Committee, TDC 1

FOREWORD

This Indian Standard (Part 4) (First Revision) was adopted by the Bureau of Indian Standards on 7 June 1989, after the draft finalized by the Physical Methods of Test Sectional Committee had been approved by the Textile Division Council.

This standard which was published in 1969 (as Part 3) has been revised on the basis of experience gained during its use.

In the preparation of this standard, due weightage has been given to the testing practices followed in the country in this field.

This standard (Part 4) forms a part of series of standards under the title 'Methods of test for tyre yarns, cords and tyre cord warpsheets made from man-made fibres'. The other parts under the series are:

IS 4910 (Part 1) : 1989 Definition of terms
IS 4910 (Part 2) : 1989 Linear density
IS 4910 (Part 3) : 1989 Load and elongation characteristics
IS 4910 (Part 5) : 1989 Heat shrinkage and heat shrinkage force
IS 4910 (Part 6) : 1989 Wet contraction and wet contractile force
IS 4910 (Part 7) : 1989 Heat degradation
IS 4910 (Part 8) : 1989 Thickness
IS 4910 (Part 9) : 1978 Sampling for tyre yarns, cords and tyre fabrics made from rayon
IS 4910 (Part 10) : 1989 Creep
IS 4910 (Part 11) : 1989 Commercial mass
IS 4910 (Part 12) : 1981 Sampling for tyre yarns, cords and tyre cord fabrics made from polyamide
IS 4910 (Part 13) : 1989 Static Adhesion of textile tyre cord to vulcanised rubber

In reporting the result of a test made in accordance with this standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'.

Indian Standard

TYRE YARNS, CORDS AND TYRE CORD WARPSHEETS MADE FROM MAN-MADE FIBRES — METHODS OF TEST

PART 4 DIP PICK-UP

(First Revision)

1 SCOPE

1.1 This standard (Part 4) prescribes methods for determination of amount of dip on man-made fibre tyre yarns, cords and warpsheets treated with resorcinol formaldehyde latex (RFL) dip solution.

2 REFERENCE

IS 667 : 1981 Methods for identification of textile fibres (*first revision*).

3 PRINCIPLE

3.1 The oven dried dipped material is treated to dissolve pure textile material leaving behind the dip as residue. The residue is oven dried and weighed, and is expressed as the percentage of the oven dry mass of the pure textile material.

4 SAMPLING

4.1 Sample from the lot shall be drawn so as to be representative of the lot. Sample drawn in accordance with the relevant material specification or as agreed to between the buyer and the seller shall be held to be representative of the lot.

5 PREPARATION OF TEST SPECIMEN

5.1 Roll the test sample (weighing about 10 g) under a strong pressure to crush the yarn or cord into a flat ribbon which is more readily penetrated by the reagent. If the crushing apparatus is not available, untwist the yarn into their constituents and cut them into pieces of about 2 mm length with the help of scissors. In either case, take care to see that no material is lost during crushing or cutting. Alternatively, cut the specimen with scissors to 1·6 mm and then crush using mortar and pestle to make it fluffy which would readily dissolve in the reagents.

6 METHOD FOR DIPPED NYLON (POLYAMIDE) TYRE YARNS AND CORDS

6.1 Apparatus and Reagents

6.1.1 *Apparatus*

a) *Drying oven*, provided with forced ventilation and capable of maintaining a temperature of 150 ± 3°C.

b) *Pan balance and weights*, of sufficient capacity to weigh the specimen required for the purpose and capable of weighing the specimen to an accuracy of 1 mg.

c) *Weighing bottles*

d) *Desiccator*

e) *Suction flask and suction device*

f) *Beaker with watch glass cover*, 400 m.

g) *Scissores*

h) *Gooch crucible No. 4*

6.1.2 *Reagents*

a) *Formic acid*, 85 percent (**m/m**).

b) *Acetone*

c) *Methyl orange* (0·1 percent in water)

6.2 Procedure

6.2.1 Identify the fibre, that is, nylon (polyamide) by the methods prescribed in IS 667: 1981. Take at least 2 test specimens, each weighing 1 g. Transfer the specimen into a weighing container. Dry the specimen to constant mass in ventilated drying oven, maintained at 150 ± 3°C and fed with air from standard atmosphere. The mass shall be taken as constant when the difference between two successive weighings made at an interval of 20 minutes is less than 0·1 percent.

6.2.2 Determine the mass of the specimen without removing it from the oven with the air flow stopped. In case the drying oven is not provided with the weighing balance, cool the specimen to room temperature in the desiccator and determine its mass correct to 1 mg.

6.2.3 *Dissolving of Textile*

Introduce the test specimen into a 400 ml beaker, taking care to avoid any loss of material Dissolve the textile material by adding 100 ml of 85 percent formic acid into the beaker. Stir the contents of the beaker with glass stirrer occasionally at room temperature until the textile material is completely dissolved.

6.2.4 Transfer the contents of the beaker as obtained in **6.2.3** to the Gooch crucible No. 4 in portions and filter the solution. Rinse the beaker with three 25 ml portions of formic acid and use this for rinsing the crucible. Continue rinsing with distilled water until neutral reaction to methyl orange is obtained. Finally rinse with 15 ml of acetone.

6.2.5 Dry the residue and crucible at 150 ± 3°C in the drying oven to constant mass and determine the mass of the residue correct to 1 mg.

7 METHOD FOR DIPPED RAYON TYRE YARNS AND CORDS

7.1 Apparatus and Reagents

7.1.1 *Apparatus*

Same as in **6.1.1**.

7.1.2 *Reagents*

a) *Formic acid*, 85 percent (*m*/*m*).

b) *Sulphuric acid*, 98 percent (*m*/*m*).

c) *Acetone*

d) *Methyl orange* (0·1 percent in water)

7.2 Procedure

7.2.1 Identify the fibre by the methods prescribed in IS 667 : 1981. Take at least 2 test specimens, each weighing about 1 g. Transfer the specimen into a weighing container. Dry the specimen to constant mass in the ventilated drying oven, maintained at 150 ± 3°C and fed with air from standard atmosphere. The mass shall be taken as constant when the difference between two successive weighings made at an interval of 20 minutes is less than 0.1 percent.

7.2.2 Determine the mass of the specimen without removing it from the oven with the air flow stopped. In case the drying oven is not provided with the weighing balance, cool the specimen to room temperature in the desiccator and determine its mass correct to 1 mg.

7.2.3 *Dissolving of Textile*

Introduce the test specimen into a 400-ml beaker, taking care to avoid any loss of material Dissolve the textile material by adding 100 ml of 85 percent formic acid into the beaker. Stir the contents of beaker with glass stirrer continuously for 20 minutes. Then add 20 ml of 98 percent sulphuric acid. Cover the beaker with a watch glass and stir it occasionally with glass stirrer until textile material is completely dissolved.

7.2.4 Transfer the contents of the beaker as obtained in **7.2.3** in portions to the Gooch crucible No. 4. Rinse the beaker with three 25 ml portions of formic acid and use this for rinsing the crucible. Continue rinsing with distilled water until neutral reaction to methyl orange is obtained. Finally rinse with 50 ml of acetone.

7.2.5 Dry the residue and crucible at 150° ± 3°C in the drying oven to constant mass and determine the mass of the residue correct to 1 mg.

8 METHOD FOR DIPPED POLYESTER TYRE YARNS AND CORDS

8.1 Apparatus and Reagents

8.1.1 *Apparatus*

a) *Erlenmeyer extraction flask*, 250 ml.

b) *Water cooled condenser*

c) *Drying oven*

d) *Pan balance and weights*

e) *Weighing bottles*

f) *Desiccator*

g) *Suction flask and suction device*

h) *Scissors*

j) *Gooch Crucible No. 4*

8.1.2 *Reagents*

a) *Methylene chloride*, reagent grade.

b) *Trichloroacetic acid*, reagent grade.

c) *Trichloroacetic acid, methylene chloride solution* (30 percent *m*/*v*). Dissolve 60 g of trichloroacetic acid in 200 ml of methylene chloride.

8.2 Procedure

8.2.1 Identify the fibre by the methods prescribed in IS 667 : 1981. Take at least 2 test specimens, each weighing about 1 g. Transfer the specimen into a weighing container. Dry the specimen to constant mass in ventilated drying oven, maintained at 150 ± 3°C and fed with air from standard atmosphere. The mass shall be taken as constant when the difference between two successive weighings made at an interval of 20 minutes is less than 0·1 percent.

8.2.2 Determine the mass of the specimen without removing it from the oven with the air flow stopped. In case the drying oven is not provided with the weighing balance, cool the specimen to room temperature in the desiccator and determine its mass correct to 1 mg.

8.2.3 *Dissolving of Textile*

Transfer the specimen to the 250 ml Erlenmeyer extraction flask and add 75 ml of trichloreacetic acid-methylene chloride solution. Attach the flask to the condenser and reflux for 15 minutes or until the specimen appears to be dissolved.

8.2.4 When the solution of the specimen is complete, filter the specimen through a Gooch crucible No. 4. Wash the flask and residue on the crucible with three successive 25 ml portions of methylene chloride.

8.2.5 Dry the Gooch crucible with dip solids residue at a temperature of 150 ± 3°C to constant mass. Cool in a desiccator and weigh to the nearest 1 mg.

9 CALCULATION AND REPORT

9.1 Calculate the amount of dip present in the tyre yarn or cord by the following formula:

$$D = \frac{M_r}{M_m - M_r} \times 100$$

where

D = amount of dip in percentage;

M_r = oven dry mass of the residue, in g ; and

M_m = oven dry mass of textile material in g.

9.2 The report shall include the following information:

a) Type of material,

b) Number of tests,

c) Amount of dip in percentage, and

d) Method used (*see* **7** *and* **8**).

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi _ 10002
Telephones : 331 01 31, 331 13 75

Telegrams : Manaksanstha
(Common to all Offices)

Regional Offices:	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110002	331 01 31 331 13 75
Eastern : 1/14 C. I. T. Scheme VII M, V. I. P. Road, Maniktola CALCUTTA 700054	36 24 99
Northern : SCO 445-446, Sector 35-C, CHANDIGARH 160036	2 18 43 3 16 41
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